

Catalytic Dehydration of Lower Alcohols over High Silica Content Zeolite W

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Zeolite W having the merlinoite structure was synthesized hydrothermally using aluminum precursor¹. Potassium type W zeolites were synthesized by both hydrothermally and using microwave with the composition; $K_2O: Al_2O_3: SiO_2: H_2O = 5.6: 1: 6.4: 165$ where potassium hydroxide as a potassium source, aluminum hydroxide as an aluminum source, and Ludox HS-40 as a silica source. The crystalline product showed two distinct morphologies i.e., rod-like morphology was prepared by microwave of which aspect ratio was 4.5 and twin-ball type morphology was obtained hydrothermally. Ethylene glycol (EG) was also used for morphology control by putting in reactive gels due to its strong gelating power compared with the product without EG addition². This zeolite W could adsorb water molecules because of its specific small pore size and the reversible water sorption was confirmed by temperature programmed desorption (TPD). Also, CO_2 TPD curve proved its basic property of surface. Furthermore, the catalytic properties of this material has been examined for a methanol and ethanol dehydration resulting ethylene and dimethylether respectively under the acidic surface condition after ion exchange with hydrogen form.